

## AMENDMENTS TO THE CLAIMS

Claims 1 – 44 (cancelled)

45. (Currently Amended) A low-volume hybridization device chamber, comprising:  
a base,  
a reaction chamber disposed in said base, said reaction chamber being bound by a flexible diaphragm, and  
a probe array disposed in said reaction chamber.

46. (Currently Amended) The low-volume hybridization device chamber of claim 45, wherein said reaction chamber has a volume in the range of 0.1 to 100  $\mu$ l.

47. (Currently Amended) The low-volume hybridization device chamber of claim 45, wherein said reaction chamber has a volume in the range of 1 to 20  $\mu$ l.

48. (Currently Amended) The low-volume hybridization device chamber of claim 45 [[1]], further comprising:  
a pneumatic system for moving said flexible diaphragm.

49. (Original) A hybridization device, comprising:  
a base,  
a fluidic chamber disposed in said base, said fluidic chamber having a hybridization array disposed therein,  
a porous membrane disposed in said fluidic chamber opposite said array,  
a pneumatic port disposed in said base, said pneumatic port addressing said porous membrane, and  
a thermal control device for controlling the temperature in the array.

Claims 50 – 65 (Cancelled)

66. (New) The low-volume hybridization device of claim 45 including an addressable heater thermally coupled to said reaction chamber.

67. (New) The low-volume hybridization device of claim 66 including a thermal insulation in contact with said heater.

68. (New) The low-volume hybridization device of claim 66 including a temperature sensor positioned adjacent said heater.

69. (New) The low-volume hybridization device of claim 45, including a cooler thermally coupled to said reaction chamber.

70. (New) The low-volume hybridization device of claim 69, wherein said cooler is a thermoelectric cooler.

71. (New) The low-volume hybridization device of claim 45 further including an extraction chamber constructed and arranged to exchange fluids with said reaction chamber.

72. (New) The low-volume hybridization device of claim 71, wherein said extraction chamber includes a porous flow-through plug having nucleic acid binding properties.

73. (New) The low-volume hybridization device of claim 72, wherein said plug is a deformable plug.

74. (New) The low-volume hybridization device of claim 73, wherein said flexible diaphragm is constructed and arranged to compress said deformable plug for removing trapped liquids.

75. (New) The low-volume hybridization device of claim 72, wherein said plug comprises glass wool.

76. (New) The low-volume hybridization device of claim 72, wherein said plug is pretreated with an agent for enhancing the nucleic acid binding properties.

77. (New) The low-volume hybridization device of claim 76, wherein said agent is selected from the group consisting of acids, bases, silanes, polysine, tethered antibodies, synthesized nucleic acids, and Poly-T DNA.

78. (New) The low-volume hybridization device of claim 71, wherein said extraction chamber includes a textured surface having nucleic acid binding properties.

79. (New) The low-volume hybridization device of claim 71, wherein said extraction chamber includes a structure comprising an open cell foam.

80. (New) The low-volume hybridization device of claim 71, wherein said extraction chamber includes an affinity surface having particles attached thereto, the particles having nucleic acid binding properties.

81. (New) The low-volume hybridization device of claim 80, wherein said affinity surface includes controlled-pore glass structures.

82. (New) The low-volume hybridization device of claim 80, wherein said affinity surface has glass spheres attached thereto.

83. (New) The low-volume hybridization device of claim 80, wherein said affinity surface has cellulose particles attached thereto.

84. (New) The low-volume hybridization device of claim 80, wherein said affinity surface is microfabricated.

85. (New) The low-volume hybridization device of claim 80, wherein said affinity surface is machined.

86. (New) The low-volume hybridization device of claim 80, wherein said affinity surface is injection molded.

87. (New) The low-volume hybridization device of claim 45 further including a base-unit including a manifold constructed and arranged to control said flexible diaphragm.

88. (New) The low-volume hybridization device of claim 87 wherein said manifold is a vacuum manifold.

89. (New) The low-volume hybridization device of claim 87 wherein said base-unit further includes flow connectors for delivering fluid to said reaction chamber.

90. (New) The low-volume hybridization device of claim 87 wherein said base-unit further includes electrical connectors for controlling operation within said device.

91. (New) A low-volume hybridization device, comprising:  
a base,  
a reaction chamber disposed in said base, said reaction chamber being bound by a flexible diaphragm,  
a probe array disposed in said reaction chamber, and  
a processing chamber connectable to said reaction chamber and constructed for exchanging fluids with said reaction chamber.

92. (New) The low-volume hybridization device of claim 91 including a pneumatic manifold constructed and arranged to deflect said flexible diaphragm for exchange fluids between said reaction chamber and said processing chamber.

93. (New) The low-volume hybridization device of claim 92 wherein said processing chamber includes an amplification chamber.

94. (New) The low-volume hybridization device of claim 93 wherein said amplification chamber is constructed for PCR amplification.

95. (New) The low-volume hybridization device of claim 92 wherein said processing chamber includes a sample acquisition chamber.

96. (New) The low-volume hybridization device of claim 92 wherein said processing chamber includes an extraction chamber.

97. (New) The low-volume hybridization device of claim 96, wherein said extraction chamber includes a porous flow-through plug having nucleic acid binding properties.

98. (New) The low-volume hybridization device of claim 97, wherein said plug is a deformable plug.

99. (New) The low-volume hybridization device of claim 98, wherein said flexible diaphragm is constructed and arranged to compress said deformable plug for removing trapped liquids.

100. (New) The low-volume hybridization device of claim 97, wherein said plug comprises glass wool.

101. (New) The low-volume hybridization device of claim 97, wherein said plug is pretreated with an agent for enhancing the nucleic acid binding properties.

102. (New) The low-volume hybridization device of claim 96, wherein said extraction chamber includes a textured surface having nucleic acid binding properties.

103. (New) The low-volume hybridization device of claim 96, wherein said extraction chamber includes a structure comprising an open cell foam.

104. (New) The low-volume hybridization device of claim 96, wherein said extraction chamber includes an affinity surface having particles attached thereto, the particles having nucleic acid binding properties.

105. (New) The low-volume hybridization device of claim 104, wherein said affinity surface includes controlled-pore glass structures.

106. (New) The low-volume hybridization device of claim 104, wherein said affinity surface has glass spheres attached thereto.

107. (New) The low-volume hybridization device of claim 104, wherein said affinity surface has cellulose particles attached thereto.

108. (New) The low-volume hybridization device of claim 104, wherein said affinity surface is microfabricated.

109. (New) The low-volume hybridization device of claim 104, wherein said affinity surface is machined.

110. (New) The low-volume hybridization device of claim 104, wherein said affinity surface is injection molded.